

Written Reports
Suggestions
for Good Scientific Writing

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Written Reports
Suggestions
for Good Scientific Writing

Part I

General Suggestions



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Written Reports
Suggestions for Good Scientific Writing

Writing METHODS – A Few Suggestions

1. You may use first person plural (*e.g.* We measured light flux density...) or passive voice (*e.g.* Light flux density was measured...)
2. Place the subject of each sentence as early as possible in the sentence.
Poor: “In order to determine light attenuation, we measured light...”
Better: “We determined light attenuation based upon measured light...”
3. Make two concise sentences rather than a long string of clauses.
4. Be precise so that the reader could repeat your “Methods” and obtain your materials and instruments.

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Figure 1 Cedarville U. Prairie Restoration
Rank-Abundance: August, 2001 and Sept., 2002

What is this figure?

Where?

Method?

Brief interpret

Chart title explains subject under investigation and its location and time frame. Axes labels give parameters.

Figure 1. Rank-abundance curves for plant species of the Cedarville University Prairie Restoration, based on quadrat sampling during two different summers. A slightly greater species evenness was evident among the ten most abundant species in 2001 compared to 2002. Such comparisons, however, must consider the larger sample size in 2001. The 52 quadrat samples in 2001 expressed a more accurate estimate of species richness than the 19 samples in 2002.

...and, notes any cautions.

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Suggestions for Good Scientific Writing

Preparing Figures: Some Examples
Read the "bubbles" to understand the intent:

RELATIVE FREQUENCY

Frequency

Species Rank

- Summer 1996
- Summer 1998
- ▲ Spring 1996
- ◆ Spring 1998

Chart title explains subject under investigation. Axes labels give parameters.

Legend repeats chart title (what-where-when), and refers to "Methods" (how)...

...then, helps reader interpret the data...

Figure 2. Relative frequency of species encountered in 1996 and 1998 in spring and summer burn plots plotted against rank order abundance. Slopes of frequencies plotted against ranks 1–24 are similar for plots burned in spring of 1998 (-0.024) and plots yet unburned in 1996, but the slope is significantly less (-0.014) for plots burned in the summer of 1998 ($p < 0.001$), indicating reduced dominance after the summer burns.

*Modified from Copeland, et al. 10(2). 2002. Restoration Ecology

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Suggestions for Good Scientific Writing

Preparing Figures: Some Examples
Read the "bubbles" to understand the intent:

Ice Thickness (cm)

Year

Legend states the "what-where-when"

...then, helps reader interpret the data...

Figure 2. Ice thickness (in centimeters) for an alpine lake, Green Lake Four, located in the Colorado Front Range. Although ambient temperatures have not significantly changed, ice depth and duration are on the decline. Updated from Caine (2002).

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Written Reports

Suggestions for Good Scientific Writing

Writing RESULTS or DISCUSSION:

Which of the following sentences states the experimental results best?

SENTENCE A:

"Table 2 shows that the most dominant plant species are Indian Grass and Tall Goldenrod."

SENTENCE B:

"Indian Grass and Tall Goldenrod are the most dominant plant species of the prairie restoration site as estimated by random plot sampling (Table 2)."

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Concise Scientific Writing

Suggestions for Good Scientific Writing

RESULTS -- critique of SENTENCE A:

SENTENCE A:

"Table 2 shows that the most dominant plant species are Indian Grass and Tall Goldenrod."

"Table 2" above makes a poor subject. See SENTENCE B.

You need not "show" the reader the data. See reference to "(Table 2)" in SENTENCE B.

But how are "dominants" judged? Include reference to method used to determine (see Sentence B.)

SENTENCE B:

"Indian Grass and Tall Goldenrod are the most dominant plant species of the prairie restoration site as estimated by random plot sampling (Table 2)."

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Written Reports
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Part II
Using Statistics
in Your
Results and Discussion



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Written Reports
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Writing RESULTS – Referring to Statistical Testing

Which of the following sentences states the RESULTS best?

SENTENCE A:
“Figure 1 shows that plants grown under high light intensity had longer stem internodes as shown by our t-value of 2.81 which was significant at the 95% level for 12 degrees of freedom.”

SENTENCE B:
“Increased light intensity caused significantly greater internode elongation in radish plants (t-test, $p < 0.05$) (Figure 1).”

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Concise Scientific Writing
Suggestions for Good Scientific Writing

RESULTS -- critique of SENTENCE A:

SENTENCE A:
"Figure 1 shows that plants grown under high light intensity had longer stem internodes as shown by our t-value of 2.81 which was significant at the 95% level for 12 degrees of freedom."

You need not "show" the reader the data. See "(Figure 1)" in SENTENCE B.

You need not go into this detail in RESULTS if you have explained what statistical test you used in METHODS.

Your variable (light intensity) should be the subject. See SENTENCE B

The t-value itself is not significant. Rather it may indicate that the difference between two means is significant.

SENTENCE B:
"Increased light intensity caused significantly greater internode elongation in radish plants (t-test, $p < 0.05$) (Figure 1)."

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Concise Scientific Writing
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Here is a critique of two sentences which refer to statistical probability.

SENTENCE A:
"Figure 1 shows that plants grown under high light intensity had longer stem internodes as shown by our t-value of 2.81 which was significant at the 95% level for 12 degrees of freedom."

Reader encounters subject first

The "significantly greater" indicates that you have based your claim on statistical tests (see blue bubble below).

SENTENCE B:
"Increased light intensity caused significantly greater internode elongation (t-test, $p < 0.05$) in radish plants (Figure 1)."

Brief parenthetical reference to t-test supports your claim of "significantly greater" meaning that you can reject H_0 with < 5% chance of Type I error.

Reader will know where to find data by this brief reference.

Suggested Basic Format for Data Table:

Table 1. Effect of Low Soil Water Potential on Soybean Leaf Mass and Chlorophyll Content

Parameters →	Soil Ψ_w and Leaf Mass (mg)			Soil Ψ_w and Chlorophyll (SPAD Units)		
	Optimal vs. Low	Optimal vs. Intern	Intermed. vs. Low	Optimal vs. Low	Optimal vs. Intern	Intermed. vs. Low
Comparisons →						
Means						
Degrees of Freedom						
t-values						
p						